ATTACHMENT 8, ECONOMIC ANALYSIS: WATER QUALITY AND OTHER EXPECTED BENEFITS

I. Introduction

Cosumnes American Bear Yuba (CABY) is a collaborative planning effort that adopted an Integrated Regional Water Management Plan (IRWMP) in December 2006. Diverse stakeholder involvement was a priority from the beginning and CABY comprises more than 30 organizations, representing water supply, conservation, recreation, agriculture, and community interests, as well as federal and local government agencies. Many of the communities participating in the planning effort are small and rural with concentrations of disadvantaged groups.

The CABY region comprises four watersheds—the Cosumnes, American, Bear, and Yuba—which combine to form a major drainage area of the western slope of the Sierra Nevada range, from the mountain crest to the Central Valley. The collective streams, rivers, lakes, and reservoirs of these watersheds flow into the Sacramento River and are a major source of fresh water for the State of California.

The CABY planning effort seeks a sustainable water management program that meets water needs and demands without compromising the natural environment. The CABY partners and water agencies recognize the value of investing in a diverse water supply portfolio that emphasizes efficiency and improves reliability in the face of droughts, emergencies, and global warming. The projects included in this CABY application under the Proposition 84 Implementation Grant solicitation reflect theses goals:

1. Provide safe, reliable and efficient water infrastructure in order to meet the basic and immediate water supply needs within underserved populations in the CABY region.
2. Ensure equitable water service levels within small, rural and/or disadvantaged communities.
3. Proactively prepare for drought or water shortage conditions in small, rural and disadvantaged communities by building the institutional capacity of these communities.
4. Implement projects that will result in immediate water savings and improve system efficiency to increase resiliency to drought and water shortages.
5. Facilitate open exchange of project specific information for the benefit of other similar communities across the CABY region and the State.

To meet these goals, the projects include multiple infrastructure enhancement, conservation, and planning initiatives. They are sponsored by five organizations: Washington County Water District, Nevada City, the Placer County Water Agency, Grizzly Flats Community Services District, and American Rivers. The majority of the projects would meet the urgent needs of high-priority CABY regional constituents: small, rural, and disadvantaged communities.

If funded, the projects would improve the functionality and resiliency of the region's water supply. Water supply is broadly comprised of the natural waterways, watersheds and associated ecosystems that produce, store, filter, and convey water for human-use demands and environmental purposes, and the human-built infrastructure—the pipes, pumps, and reservoirs—that moves water to the places and times where humans demand it. This Attachment presents the costs and water supply-related benefits of the projects.

II. Framework and Methodology

The proposed projects would yield water quality and other related benefits to the extent that they increase the value of goods and services available to Californians. The proposed projects have the potential to increase the value of these goods and services in three ways: by lowering the cost of providing a given supply, by increasing the supply of a given benefit, and by increasing the demand for a given benefit. The projects would produce few goods and services directly; instead, they primarily would enhance the supply of capital necessary to provide goods and services.[8] Thus, the proposed projects would produce benefits to the extent that they increase the region's stock of capital, and the quantity or types of goods and services that flow from it. The proposed projects may also produce benefits to the extent that they affect the demand for, and, hence, the value of certain goods and services.

Many of the proposed projects would produce benefits by affecting, directly and indirectly, the region's stock of natural capital. Natural capital is a term used to describe the inventory of nature's physical building blocks (e.g., trees, water, fish, soil, etc.) and the functional interconnections between the building blocks, which together form ecosystems (Daily 1997). Ecosystems are dynamic systems that support physical, chemical, and biological processes that influence flows, storage, and transformation of matter and energy (Campbell 2009). These "ecosystem processes" contribute to the maintenance and accumulation of the building blocks of natural capital, and in this way, are inextricably interrelated with the concept of natural capital. Some of the projects would affect the region's supply of natural capital and the associated ecosystem processes, for example, by increasing water flows in a stream during summer months when flows otherwise would diminish or disappear.

These changes in natural capital may be quantifiable, but they do not produce economic benefits directly (either quantifiable or unquantifiable). Instead, improvements in natural capital lead to changes in goods and services people value, which are collectively called ecosystem services. Ecosystem services describe the ways in which humans derive value from nature. The proposed projects' direct and indirect effects on natural capital would change the types and quantities of ecosystem services people can derive from the water and related resources of a particular area, and by doing so, produce economic benefits (or costs, if the types or quantities of ecosystem services are diminished). The improvements in instream flows described above could produce economic benefits by increasing the quality of water in the stream and enhancing the number of salmon available for fishing, improving the quality and quantity of water-based recreation, or reducing the costs for downstream water users who otherwise would be required to reduce their withdrawals of water as stream flows diminish.

Figure 1 illustrates a list of ecosystem services. Consistent with widely accepted professional standards and the economic framework outlined above, this list includes a broad suite of services, including those whose value comes from indirect or non-use of resources (U.S. Environmental Protection Agency 2009, National Research Council 2004, U.S. Environmental

[8] Economists use the term capital to describe resources commonly used to produce things people value (e.g., different types of goods and services). Classifications differ, but most economists generally recognize five types of capital: natural, human-built, human, social, and financial. Natural capital refers to the components of nature, e.g., water, trees, and soil, and the interactions between these components. Human-built capital refers to water-delivery infrastructure, roads, and other tangible goods and infrastructure. Human capital refers to the knowledge and skills embodied in people. Social capital refers to social networks, cultural norms, laws, and political systems. Financial capital refers to money, sources of credit, and stocks traded in markets.

Figure 1. Illustrative List of Ecosystem Services

	Functions	Examples of Services Produced
1	Production and regulation of water	Natural and human-built features of an ecosystem capture precipitation; filter, retain, and store water; regulate levels and timing of runoff and stream flows; and influence drainage.
2	Formation & retention of soil	Wetlands and biota accumulate organic matter, and prevent erosion to help maintain productivity of soils.
3	Regulation of atmosphere & climate	Biota produce oxygen, and help maintain good air quality and a favorable climate for human habitation, health, and cultivation.
4	Regulation of disturbances	Wetlands and reservoirs reduce economic flood damage by storing flood waters, reducing flood height, and slowing a flood's velocity.
5	Regulation of nutrients and pollution	Wetlands and riparian vegetation improve water quality by trapping pollutants before they reach streams and aquifers; natural processes improve water quality by removing pollutants from streams.
6	Provision of habitat	Wetlands, riparian vegetation, streams, and reservoirs provide habitat for economically important fish and wildlife.
7	Food production	Biota convert solar energy into plants and animals edible by humans.
8	Production of raw materials	Streams and biota generate materials for construction, fuel, and fodder; streams possess energy convertible to electricity.
9	Pollination	Insects facilitate pollination of economically important wild plants and agricultural crops.
10	Biological control	Water-related birds and microorganisms control pests and diseases.
11	Production of genetic & medicinal resources	Genetic material in wild plants and animals provide potential basis for drugs and pharmaceuticals.
12	Production of ornamental resources	Products from water-related plants and animals provide materials for handicraft, jewelry, worship, decoration, and souvenirs.
13	Production of aesthetic resources	Wetlands, riparian vegetation, streams, and reservoirs provide basis for enjoyment of scenery from roads, housing, parks, trails, etc.
14	Production of recreational resources	Streams, reservoirs, riparian vegetation, fish, waterfowl, and other wildlife provide basis for outdoor sports, eco-tourism, etc.
15	Production of spiritual, historic, cultural, and artistic resources	Wetlands, riparian vegetation, streams, and reservoirs serve as basis for spiritual renewal, focus of folklore, symbols of group identity, motif for advertising, etc.
16	Production of scientific and educational resources	Wetlands, riparian vegetation, streams, and reservoirs provide inputs for research and focus for on-site education.

Source: Adapted by ECONorthwest from De Groot, R., M. Wilson, and R. Boumans. 2002; Kusler, J. 2003; Postel, S. and S. Carpenter in Daily 1997.

Protection Agency 2000). The list may expand or contract depending on human preferences over time and across geographic areas. We emphasize that, while natural capital exists everywhere, independent of human society, ecosystem services only exist insofar as there is human demand for their supply, at a particular place and time, and their value reflects the specific context within which the demand exists.

Other economic benefits could arise from a proposed project's effects on the region's supply of human capital (e.g., knowledge and skills embodied in people), by, for example, initiating and supporting education efforts; on its supply of social capital (e.g., social networks and cultural norms), by, for example, supporting planning activities that bring people together to solve problems in constructive and collaborative ways; on its supply of human-built capital, by, for example, initiating the construction or repair of structures; and on its supply of financial capital,

by, for example, enhancing the ability of an entity to secure additional sources of funding through loans or grants.

Our estimates of the water quality and other expected benefits each project would generate reflect the marginal, net willingness of Californians to pay, measured in the dollars of 2009, for the goods and services the proposed projects would increase. Economic benefits arising from changes in the supply of some goods and services, especially those derived from natural capital, human capital and social capital, are often difficult to quantify in monetary terms, because they are not traded in markets and cannot be measured using price data and price-dependent techniques. This does not mean that their value is zero.

In some cases, these benefits can be measured using non-market techniques, such as the travel-cost method and the contingent-valuation method. These, and related non-market valuation methods have received considerable scrutiny, and they typically have been tested more rigorously than methods commonly used to estimate the value of water in market settings, such as industrial water use, crop irrigation, and hydropower generation (Young 2005). Non-market valuation techniques generally are cumbersome to implement and, hence, they have not been applied universally to all benefits in all locations. Therefore, in most cases, to estimate the value of non-market benefits, we typically must apply to this region values that were estimated elsewhere.

Transferring estimates of value from one location to another inherently generates questions regarding the reliability of the results. Several factors, however, provide reassurance that we have not overestimated the value of the expected benefits. We have followed transfer guidelines expressed by the U.S. Environmental Protection Agency (2000). Insofar as possible, whenever project-specific estimates of value are not available, we have strived to identify estimates from settings with similar economic characteristics, and especially those from nearby watersheds or from within California. Moreover, although we anticipate that the real value of ecosystem goods and services, such as high-quality water in streams, healthy riparian forests, and robust salmon populations, will increase over time, all else equal, we lack defensible forecasts of the rates of increase and, hence, have not folded these increases into our estimates.

Another factor that suggests our estimates of value probably are less than the true value stems from the geographic scope of most of the studies on which we rely. Nearly all the non-market estimates of value we employ were developed using techniques that focused on a subset of the relevant population. Estimates based on surveys of households, for example, often sought to determine the value that households in the surrounding area place on a particular environmental resource and overlooked the value that households further away place on it. Such techniques can seriously underestimate the true value of environmental amenities in the North Coast Region, insofar as this region's natural resources are economically important to households living far away. Moreover, recent research has found that a significant percentage of the total economic benefit households derive from areas such as this materialize in distant metropolitan areas (Schmidt and Courant 2006). In this instance, much of the economic benefit that would be produced by projects that propose to protect or enhance the environment of the North Coast Region would materialize to households outside the region, especially to residents of the state's major metropolitan areas. By deriving our estimates of benefits from past studies that often overlooked these distance effects, we have unavoidably failed to capture this distance-related component of value.

Our estimates of environmental benefits further underestimate the true value insofar as the studies on which we base the estimates have examined the value of specific ecosystem goods and services in isolation, overlooking the cumulative value provided to human society by the ecosystem as a whole. Both ecologists and economists have recognized the importance of the integrated, composite workings of ecosystems, but both disciplines have yet to develop reliable techniques for describing, let alone measuring their value (Millennium Ecosystem Assessment 2005). In effect, then, our estimates give only a partial view of the total value of improvements in environmental quality.

To further buttress our belief that our non-market estimates of value probably underestimate the true value of the potential benefits from protecting and enhancing the environment, we turn to the National Research Council's review of methods for valuing the goods and services produced by water-related ecosystems. Based on its assessment, the report concluded,

> "**There is a much greater danger of underestimating the value of ecosystem goods and services than over-estimating their value.** Under-estimation stems primarily from the failure to include in the value estimates all of the affected goods and services and/or all of the sources of value, or from use of a valuation method that provides only a lower bound estimate of value. In many cases, this reflects the limitations of the available valuation methods. Over-estimation, on the other hand, can stem from double-counting or from possible biases in valuation methods. However, it is likely that in most applications the errors from omission of relevant components of value will exceed the errors from over-estimation of the components that are included (National Research Council 2004, p. 242)."

We believe this conclusion applies in this instance: the likelihood that we have underestimated the benefits of the proposed projects is far greater than the likelihood that we have overestimated them.

Similar to the process described in Attachment 7 for water-supply benefits, to estimate water quality-related benefits and other benefits, we:

- Worked with each project proponent, using a with-vs.-without framework, to describe the expected outcome of each project in terms of the expected net increase in the supply of different types of goods and services, the avoided costs of project-related activities, and/or the change in the demand for water supply-related goods and services.
- Reviewed the existing economic literature to identify relevant studies that identify the marginal value to Californians of each type of good and service.
- Selected from the existing literature, where appropriate, a reasonable estimate of the per-unit marginal value of each good or service. In completing this step, we first sought studies that directly measure the marginal value of the specific good or service whose supply the project would increase. If such a study were not available, we then sought studies that measure the marginal value of a good or service similar in terms of geographic location, environmental context, and economic context. In all instances we sought studies that have been peer reviewed.
- Adjusted each estimate of per-unit value of a good or service or avoided cost to its equivalent value in 2009 dollars, using the update factors provided in Table 10 of the

Proposition 84 IRWM Implementation Proposal Solicitation Package. For the years 1997 to 2001, we used the update factors provided by the Department of Water Resources in the Frequently Asked Questions: Proposition 84 Implementation Grant Program (Round 1) document, released December 3, 2010.

- Estimated the annual value of the expected increase in the supply of each type of good or service by multiplying the expected annual increase in the supply times the per-unit value, in 2009 dollars.
- Assessed the uncertainty embodied in each estimate of annual value for each type of good or service, and determined if it is reasonable to conclude that it offers an unbiased representation of the true value of the good or service. Where appropriate, we selected an estimate of per-unit value that more likely than not yields an underestimate of the true value of a project's benefits.
- Completed an internal-review process, to ensure the information we provide gives a reasonable description of the costs and benefits for each project and for the CABY Proposal as a whole.

The regional water quality benefits and other benefits of the proposal, as a whole, are described in Section III, below. The water quality benefits and other benefits of each project are described in detail in Section IV, below. Many of the projects would produce similar types of benefits. To avoid redundancy, where possible, we have included a complete discussion of the assumptions, sources, and factors contributing to uncertainty for particular economic benefits in the regional costs and benefits section, and referred to it in the discussion of each project-level benefit. Each project-level narrative contains a basic description of each benefit it would produce, which outlines the mechanisms, level of effects, and sources of uncertainty specific to each project. To ensure consistency across similar benefits for each project, the benefit descriptions share similar language from project to project. While this contributes some redundancy to the overall narrative, it is necessary to ensure each project's benefits are described completely.

III. Narrative Description: Regional Benefits

This section presents the total value of water quality-related and other benefits the suite of projects proposed for the CABY region would generate. In it, we also describe the methodologies and assumptions we use to estimate the project-level benefits, where economic quantification was possible. For each regional-level benefit, we describe sources of uncertainty and how the uncertainty might influence the direction and magnitude of the benefit. The projects would produce unquantifiable benefits in each of these. These benefits are descibed in a series of Table 16s, presented at the end of this Attachment.

A. Water-Quality Benefits

1. Economic Benefits Associated with Enhanced Water-Quality (Unquantifiable). Four projects have the potential to produce water-quality benefits by providing water for instream flows:

- Nevada City
- Washington County Water District
- Grizzly Flats Community Services District

- Placer County Water Agency (Alta & Colfax)

These flows could dilute pollutants, reduce temperature, and increase dissolved oxygen, among other effects. Data are unavailable to quantify the effects the projects would have on water-quality parameters in the region's waterways. Should the benefits materialize, however, they could provide economic benefits to water-users by reducing water-treatment costs, reducing costs of complying with water-quality and endangered species regulations, improving the quality of instream and near-stream recreation, improving habitat for aquatic species, and improving the quality of life of Californians who value clean water.

The beneficiaries of this benefit would include Californians who value the goods and services the water bodies the project would affect provide, the all Californians who value improving the quality of the state's natural waterways.

2. Passive-Use Value Associated with Increases in Salmonid Populations (Unquantifiable)

Four projects would have the potential to enhance aquatic habitat and associated salmonid populations in the CABY region's waterways and downstream in the Sacramento-San Joaquin River Delta and offshore marine environment:

- Nevada City
- Washington County Water District
- Grizzly Flats Community Services District
- Placer County Water Agency (Alta & Colfax)

Individuals derive value from increases in salmonid populations in two ways: some (e.g., recreational anglers and commercial fishermen) directly interact with salmon populations and derive benefit by catching and consuming the fish, others (including some from the former group) derive value from the salmon solely based on the salmon's existence. Studies have shown that regardless of direct interaction with salmon populations, many Californians hold a positive willingness to pay to ensure the long-term survival of salmon (Loomis 2006).

Several studies have attempted to estimate the passive use value of increases in salmonid populations among households in California and neighboring states. Passive use value, in this case, refers to the benefit individuals derive from knowing that healthy salmonid populations exist, regardless of their intent to directly interact with salmon and steelhead through fishing or some other means. In general, these studies have estimated households' average willingness to pay to implement policies that would increase salmon populations. At the per salmon level, these studies reveal that households are willing to pay only fractions of a penny for increases in salmon populations. When summed across a region, however, the total value Californians are willing to pay for increases in salmon populations can become several thousands of dollars per fish. With about 11.5 million households in California, four studies that have estimated willingness to pay values for increases in salmon populations suggest that Californians, in total, would be willing to pay these values per fish per year: $424 (Olsen Richards and Scott 1991), $2,481 (Layton, Brown, and Plummer 1999), $3,563 (Loomis 1996), and $7,910 (Bell, Huppert, and Johnson 2003). In eliciting willingness to pay estimates from respondents, these studies told respondents that

hypothetical policies would increase salmon populations by 2.5 million, 2.5 million, 300,000, and 165,000, respectively.

The studies agree that respondents' willingness to pay per fish for an increase in salmon populations decreases as the hypothetical increase in salmon stocks increases. In other words, the smaller the increase in salmon populations, the higher the willingness to pay, per fish. The proposed projects would yield small potential increases in salmon populations, relative to the size of existing populations, and to the hypothetical increases posited in the valuation studies. Hence, the value per additional fish resulting from the proposed projects likely would resemble the upper end of the range of estimates rather than the lower end. Nonetheless, to address concerns about not overestimating the benefits, we employ a value of $2,000 per additional fish per year as a rough estimate of the benefit of those projects that would increase salmon populations.

3. Cultural Value Associated with Increases in Salmonid Populations (Unquantifiable)

As described in the discussion of the preceding benefit, four projects would enhance salmonid habitat in the CABY region's waterways and in nearshore and offshore marine areas. The Native American tribes throughout California have a special relationship with salmon, relying on the fish for subsistence, cultural identity, and spiritual significance (Kass 2009).

Unlike many Californians who ascribe a monetary willingness to pay to protect salmon, even if they never intend to directly fish or watch them, many Native Americans recognize the importance of salmon outside the cultural framework and economic terms western society often imposes (Malloy 1992). Accordingly, they reject the validity of applying a dollar value to fish that constitute a core element of their cultural and spiritual well-being. For this reason, we recognize the cultural significance that arises from the projects' improvements to salmonid populations and their habitat apart from the quantified passive-use value or other measures of economic benefits.

The beneficiaries of this benefit would include members of Native American tribes—both within and outside of the region—who believe the continued existence of salmonid populations and their habitat is essential to cultural and spiritual well-being.

4. Increased Quality and Quantity of Recreation (Unquantifiable)

Four of the projects would have the potential to increase the quantity and/or quality of recreation in CABY region's waterways and adjacent riparian and upland areas by increasing instream flows:

- Nevada City
- Washington County Water District
- Grizzly Flats Community Services District
- Placer County Water Agency (Alta & Colfax)

The Grizzly Flats Community Services District project would further increase the quality of recreation by stocking a local pond with game fish removed from its pretreatment reservoir, which is currently off-limits to recreational angling.

Data are insufficient to estimate the potential increase in quantity or quality of recreation arising from improvements in instream flows or other recreational benefits generated by the projects. Despite the lack of quantifiable increases in quantity or quality of recreation, however, evidence from other, similar, projects suggests that increases would, in fact, occur.

A recreational activity is valuable insofar as individuals are willing to pay to participate in it. In most cases, individuals typically would be willing to pay some greater sum of money to participate in a recreation activity than they actually pay. The difference between the amount they would be willing to pay and the amount they actually pay is called consumer surplus. Table 2.1 contains some illustrative examples of consumer surplus values associated with a variety of recreation activities.

Table 2.1. Consumer Surplus Associated with Recreation Activities ($/user/day)

Activity	Pacific Coast Mean
Camping	$108.70
Picnicking	$66.90
Swimming	$28.43
Sightseeing	$63.30
Hiking	$33.39
Fishing	$46.21
Wildlife viewing	$37.18
General recreation	$27.84

Source: Rosenberger, R., and J. Loomis. 2001. *Benefit Transfer of Outdoor Recreation Use Values: A Technical Document Supporting the Forest Service Strategic Plan (2000 Revision).* General Technical Report: RMRS-GTR-72. U.S. Department of Agriculture, Forest Service.

Increasing the quality of recreation would, all else equal, increase the consumer surplus derived by individuals participating in the activity and, thus, increase the total benefit derived from the activities. Similarly, increasing the quantity of recreational activities, all else equal, increases the total number of recreation days experienced, also increasing the total benefit derived from the activities. While data are insufficient to estimate the potential change in quality or quantity of recreation that would result from the proposed projects, research supports the notion that the projects are likely to yield non-trivial recreation benefits.

Beneficiaries of this benefit would include individuals that participate in recreation in the area as well as businesses that sell goods and services associated with recreation in the area.

B. Other Expected Benefits

1. Enhanced Human and Social Capital (Unquantifiable)

All five projects include components that would increase the amount of information available to customers and water-system operators to use and manage water more effectively. All five projects also include planning components that would engage community members, water managers, and other stakeholders in collaborative problem solving, enhancing existing and building new relationships. These experiences would

increase the human and social capital in the region insofar as they educate the local population and/or build social ties within the community. Human and social capital are valuable in that they enhance the capacity of community members to engage in and complete future projects and are more effectively able to respond to critical issues the region is likely to face as climate change and population growth continue to put pressure on its already scarce water supplies.

One project, the CABY Water Trust, would significantly increase the social capital in the region by setting up an institutional and legal framework to facilitate voluntary water transfers from out-of-stream diversions and consumptive uses to increase instream flow for environmental purposes. In addition to setting up the institutional and legal framework required to facilitate transfers, the project would develop a body of information supportive of transfers, enable interested parties to develop skills needed to execute transfers that would increase instream flows, and support collaboration among stakeholders to build trust and overcome barriers that could impede its success.

Data are unavailable to quantify the economic benefits arising from these effects, but they could lead to lower costs of management for land managers and land owners, or the production of additional water quality and salmonid-related benefits. The beneficiaries of this benefit would include residents, water-system operators, and other stakeholders in the region, and state regulators, including DWR, which could experience reduced regulatory or enforcement costs as the local capacity to effectively solve problems increases.

IV. Narrative Description: Individual Project Benefits

This section includes a narrative description of each project's with and without conditions and the water quality-related and other benefits.

A. Nevada City

The Nevada City project involves two programs: The Infrastructure Reliability, Conservation and Efficiency Program and The Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program. The proposed project has these elements:

Infrastructure Reliability, Conservation and Efficiency Program	Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program
Gracie Street Intertie	Water Shortage Response Feasibility Study and Action Plan
South Pine Distribution System Improvement	Integrated Capital Improvement Needs Assessment
Park Avenue Distribution System Improvement	Customer-based Conservation Implementation
Prospect Street Distribution System Improvement	Plumbing Fixture Retrofit Program Implementation
Installation of Altitude Valves and SCADA System on Storage Tanks	Comprehensive Drought Preparedness Plan
Leak Detection and Repair	
Installation of Water Meters on City Facilities	

1. Project Description and Without-Project Conditions

Physical Infrastructure Improvements. The project would upgrade the infrastructure at these facilities: Gracie Street Intertie, South Pine Distribution System, Park Avenue Distribution, and Prospect Street Distribution System. It would also install altitude valves and a SCADA system on the system's storage tanks, and install water meters on city facilities. Without these improvements, Nevada City's water-supply infrastructure would continue to provide sub-optimal service to its customers, including a water-pressure level below that required by California regulations. As currently operated, the storage tanks cannot achieve their maximum storage capacity because filling all three cannot be accomplished without experiencing spills. Inadequate system capacity during peak demand periods would continue to reduce the reliability of sufficient water pressure for fire-fighting and provide inadequate pressure for some customers. Aging infrastructure would continue to pose risks of failure, which could result in prolonged service disruptions and expensive emergency repairs. Information about water use in some areas without meters would continue to be unavailable, reducing system managers' ability to effectively and efficiently operate the system and prioritize future capital improvements.

Leak Detection and Repair. This portion of the project would provide funding for Nevada City to install a leak-detection system. Without the project, many leaks throughout Nevada City's system would go undetected and unrepaired, reducing the efficiency of the water system and reducing its useable water supply. The current procedure for detecting and identifying the location of leaks involves extensive and labor-intensive surveys, which consume limited resources dedicated to operating the system. Nevada City also would continue to spend its limited resources treating water lost to leakage and not used to directly meet the demands of customers. The system would continue to operate under constant threat of catastrophic leaks and major infrastructure failures, increasing the risk that Nevada City's water-system operators and its customers would face services disruptions and expensive emergency repairs.

Water Shortage Response Feasibility Study and Action Plan, Integrated Capital Improvement Needs Assessment and Comprehensive Conservation and Drought Preparedness Planning. This portion of the project would provide funding for Nevada City to integrate the elements of its capital-improvement program with its conservation and drought-planning efforts. Without the project, Nevada City's water-system operators would have more limited information and options to effectively make decisions and prioritize investments to maximize the benefits of both supply- and demand-side strategies.

Customer-Based Conservation Implementation. This portion of the project would provide Nevada City's water-system customers with information, through workshops and public outreach, based on programs developed by the California Urban Water Conservation Council and the American Water Works Association, to help them reduce their water consumption. Without the project, customers would not have access to this information, and Nevada City's water-system operators would have a more limited range of options to manage its water system, especially in times of water shortage when customer-initiated conservation measures could reduce demands on the available water supply.

Plumbing Fixture Retrofit Program Implementation. This portion of the project would provide funding for Nevada City to provide 2,700 plumbing retrofit kits to its customers. The plumbing retrofit kits would include faucet aerators, low-flow shower heads, and information about how to displace water in toilet tanks. Without the project, customers would continue to use old and outdated plumbing devices that consume more water than modern fixtures.

We describe the costs and benefits of these individual program elements collectively, as many of their benefits are interdependent.

2. Total Water-Quality and Other Expected Benefits

This project would generate water quality and other expected benefits as described below. Table 16-A presents the value of the benefits, by category, in the years they would occur, and calculates their total present value.

a. Water-Quality Benefits

Economic Benefits Associated with Enhanced Water-Quality (Unquantifiable). To the extent that the project increases water supply available for instream flows, it would provide water quality benefits by diluting pollutants, reducing temperature, and

increasing dissolved oxygen, among other effects. Data are unavailable to quantify the effects the project would have on water-quality parameters in Little Deer Creek, the South Yuba River, or downstream in the Sacramento-San Joaquin River Delta. Should the benefits materialize, however, they could provide economic benefits to water-users by reducing water-treatment costs, reducing costs of complying with water-quality and endangered species regulations, improving the quality of instream and near-stream recreation, improving habitat for aquatic species, and improving the quality of life of Californians who value clean water.

The beneficiaries of this benefit would include Californians who value the goods and services the water bodies the project would affect provide, the all Californians who value improving the quality of the state's natural waterways.

Passive-Use Value Associated with Increases in Salmon Populations (Unquantifiable). To the extent that this project increases in instream flows into Little Deer Creek, it would also directly enhance salmon habitat in Little Deer Creek and ultimately the South Yuba River. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. Salmon-conservation science suggests, however, that increasing instream flows in salmon-bearing streams would improve the function of spawning and rearing habitat, potentially leading to increases in salmon survival and increased salmon populations (NMFS 2010, CDFG 2004).

This benefit captures the passive-use value many Californians place on the continued existence of thriving salmon populations within the state. If data were available to quantify the we would employ a value of $2,000 per additional fish per year as a rough estimate of the passive-use benefit of increase salmon populations.[9]

The beneficiaries of this benefit would Californians who value the survival of healthy salmon populations in California, but may never fish or directly interact with salmon.

Cultural Value Associated with Increases in Salmon Populations (Unquantifiable). As we describe above, the project would enhance salmon habitat in the South Yuba River. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. Salmon-conservation science suggests, however, that increasing instream flows in salmon-bearing streams would improve the function of spawning and rearing habitat, potentially leading to increases in salmon survival and increased salmon populations (NMFS 2010, CDFG 2004).

This benefit captures the cultural value many Native American people place on the continued existence of thriving salmon populations within the state. Unlike many Californians who ascribe a monetary willingness to pay to protect salmon, even if they never intend to directly fish or watch them, many Native Americans would recognize the importance of salmon outside the cultural framework and economic terms western society often imposes (Malloy 1992). For this reason, we recognize the cultural

[9] See regional-level benefits section for a description of the methodology and source used to derive this estimate.

significance that arises from the projects' improvements to salmonid populations and their habitat apart from the quantified passive-use value or other measures of economic benefits.

The beneficiaries of this benefit would include members of local Native American tribes in the region who believe the continued existence of salmonid populations and their habitat is essential to cultural and spiritual well-being.

b. Other Expected Benefits

Enhanced Human and Social Capital (Unquantifiable). The project would support efforts to prepare a Water Shortage Response Feasibility Study and Action Plan, an Integrated Capital Improvement Needs Assessment, a Customer-based Conservation Implementation program and a Comprehensive Conservation and Drought Preparedness Plan. The process for developing these plans would engage community members and system operators in a collaborative way to understand the needs of the Nevada City system, and develop effective, locally-appropriate responses to problems that could arise in the future. The process would enhance the human capital in the Nevada City system by increasing the amount and types of information available to system operators to manage the system effectively, and by educating customers about the water system, so they can respond to future supply constraints more effectively. The project's focus on collaborative problem-solving would enhance the social capital—the relationships and trust between and among residents and groups—in Nevada City, which has the potential to increase the capacity of the community to solve future problems, related and unrelated to the water-supply system.

The beneficiaries of this benefit would include the operators and customers of the Nevada City water system, and all residents within the community of Nevada City.

Please see Attachment 7 for the costs and water-supply-related benefits this project would generate.

B. Washington County Water District

The Washington County Water District (WCWD) project involves two programs: The Infrastructure Reliability, Conservation and Efficiency Program and The Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program. The proposed project has these elements:

Infrastructure Reliability, Conservation and Efficiency Program	Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program
Maybert Road Distribution Line Improvements	Water Shortage Response Feasibility Study and Action Plan
Relief Hill Road Flow Control Pressure Improvements	Integrated Capital Improvement Needs Assessment
"Level-control" Altitude Valves on Storage Tank	Customer-based Conservation Implementation
System-wide Installation of Water Meters	Plumbing Fixture Retrofit Program Implementation
Leak Detection and Repair Needs Assessment and Feasibility Study	Organizational Needs Assessment
	Comprehensive Drought Preparedness Plan

1. Project Description and Without-Project Conditions

Physical Infrastructure Improvements. The project would upgrade the infrastructure at these facilities: Maybert Road Distribution Line and Relief Hill Road. It would also install altitude valves and a SCADA system on the system's storage tanks, and install water meters throughout the system. Without these improvements, WCWD's water-supply infrastructure would continue to provide sub-optimal service to its customers, including reduced pressure and service disruptions during high-demand periods. Inadequate system capacity during peak demand periods would continue to reduce the reliability of sufficient water pressure for fire-fighting. Aging infrastructure would continue to pose risks of catastrophic failure, which could result in service disruptions and expensive emergency repairs. Information about water use throughout the system would continue to be unavailable, reducing system managers' ability to effectively and efficiently operate the system and prioritize future capital improvements.

Water Shortage Response Feasibility Study and Action Plan, Organizational Needs Assessment, Integrated Capital Improvement Needs Assessment and Comprehensive Drought Preparedness Planning. These project components would provide funding for WCWD to initiate major system-wide planning for day-to-day operations and drought preparedness. By implementing these planning processes in concert, it would allow WCWD to strategically integrate the elements of its capital-improvement program with its conservation and drought-planning efforts. Without the project, WCWD water-system operators would have more limited information and options to effectively make decisions and prioritize investments to maximize the benefits of both supply- and demand-side strategies for operating its system.

Customer-Based Conservation Implementation. This portion of the project would provide WCWD's water-system customers with information, through workshops and public outreach, based on programs developed by the California Urban Water Conservation Council and the American Water Works Association, to help them reduce their water consumption. Without the project, customers would not have access to this information, and WCWD's water-system operators would have a more limited range of options to manage its

water system, especially in times of water shortage when customer-initiated conservation measures could reduce demands on the available water supply.

Plumbing Fixture Retrofit Program Implementation. This portion of the project would provide funding for Nevada City to provide 130 plumbing retrofit kits to its customers. The plumbing retrofit kits would include faucet aerators, low-flow shower heads, and toilet displacement devices. Without the project, customers would continue to use old and outdated plumbing devices that consume more water than modern fixtures.

Leak Detection and Repair Needs Assessment and Feasibility Study. This portion of the project would provide funding for WCWD to undertake a leak detection and repair needs assessment and feasibility study. Without the project, WCWD would not have the information it would need to install a leak detection system to monitor and repair leaks more efficiently in the future. This portion of the project also would, where possible, begin to repair leaks that would be easily detectable from visual surface inspection.

We describe the costs and benefits of these individual program elements collectively, as many of the benefits of each program component are interdependent.

2. Total Water-Quality and Other Expected Benefits

This project would generate water supply-related benefits as described below. Table 16-C presents the value of the benefits, by category, in the years they would occur, and calculates their total present value.

a. Water-Quality Benefits

Economic Benefits Associated with Enhanced Water-Quality (Unquantifiable). To the extent that the project increases water supply available for instream flows, it would provide water quality benefits by diluting pollutants, reducing temperature, and increasing dissolved oxygen, among other effects. Data are unavailable to quantify the effects the project would have on water-quality parameters in Canyon Creek, the Yuba River, or downstream in the Sacramento-San Joaquin River Delta. Should the benefits materialize, however, they could provide economic benefits to water-users by reducing water-treatment costs, reducing costs of complying with water-quality and endangered species regulations, improving the quality of instream and near-stream recreation, improving habitat for aquatic species, and improving the quality of life of Californians who value clean water.

The beneficiaries of this benefit would include Californians who value the goods and services the water bodies the project would affect provide, the all Californians who value improving the quality of the state's natural waterways.

Passive-Use Value Associated with Increases in Salmon Populations (Unquantifiable). To the extent that this project increases in instream flows into Canyon Creek, it would directly enhance salmon habitat in the Yuba River. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. Salmon-conservation science suggests, however, increasing instream flows in salmon-bearing streams would improve the function of spawning and rearing habitat, potentially

leading to increases in salmon survival and increased salmon populations (NMFS 2010, CDFGH 2004).

This benefit captures the passive-use value many Californians place on the continued existence of thriving salmon populations within the state. If data were available to quantify the we would employ a value of $2,000 per additional fish per year as a rough estimate of the passive-use benefit of increase salmon populations.[10]

The beneficiaries of this benefit would Californians who value the survival of healthy salmon populations in California, but may never fish or directly interact with salmon.

Cultural Value Associated with Increases in Salmon Populations (Unquantifiable). As we describe above, the project would enhance salmon habitat in the Yuba River. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. Salmon-conservation science suggests, however, that increasing instream flows in salmon-bearing streams would improve the function of spawning and rearing habitat, potentially leading to increases in salmon survival and increased salmon populations (NMFS 2010, CDFGH 2004).

This benefit captures the cultural value many Native American people place on the continued existence of thriving salmon populations within the state. Unlike many Californians who ascribe a monetary willingness to pay to protect salmon, even if they never intend to directly fish or watch them, many Native Americans would recognize the importance of salmon outside the cultural framework and economic terms western society often imposes (Malloy 1992). For this reason, we recognize the cultural significance that arises from the projects' improvements to salmonid populations and their habitat apart from the quantified passive-use value or other measures of economic benefits.

The beneficiaries of this benefit would include members of local Native American tribes in the region who believe the continued existence of salmonid populations and their habitat is essential to cultural and spiritual well-being.

b. Other Expected Benefits

Enhanced Human and Social Capital (Unquantifiable). The project would support WCWD's efforts to prepare a Water Shortage Response Feasibility Study and Action Plan, an Organizational and Water System Needs Assessment, an Integrated Capital Improvement Needs Assessment, a Customer-based Conservation program, and a Comprehensive Drought Preparedness Plan. The project would also implement a customer-based conservation program. The process for developing these plans would engage community members and system operators in a collaborative way to understand the needs of the WCWD system, and develop effective, locally-appropriate responses to problems that could arise in the future. The process would enhance the human capital in the Washington County system by increasing the amount and types of information

[10] See regional-level benefits section for a description of the methodology and source used to derive this estimate.

available to system operators to manage the system effectively, and by educating customers about the water system, so they can respond to future supply constraints more effectively. The project's focus on collaborative problem-solving would enhance the social capital—the relationships and trust between and among residents and groups—in the WCWD community, which has the potential to increase the capacity of the community to solve future problems, related and unrelated to the water-supply system.

The beneficiaries of this benefit would include the operators and customers of the WCWD, and all residents within the community of Washington County.

Please see Attachment 7 for the costs and water-supply-related benefits this project would generate.

C. Grizzly Flats Community Services District

The Grizzly Flats Community Services District (GFCSD) project involves two programs: The Infrastructure Reliability, Conservation and Efficiency Program and The Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program. The proposed project has these elements:

Infrastructure Reliability, Conservation and Efficiency Program	Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program
Reservoir Lining	Integrated Capital Improvement Needs Assessment
Leak Detection and Repair	Customer-based Conservation Implementation
	Plumbing Fixture Retrofit Program Implementation
	Comprehensive Conservation and Drought Preparedness Plan

1. Project Description and Without-Project Conditions

Present demand for water in the GFCSD system is approximately 130 acre-feet per year (Wood Rodgers 2008). Demand is projected to reach 205 acre-feet per year by 2025 (El Dorado County Water Agency 2007). The safe yield of the system is approximately 144 acre-feet per year (Wood Rodgers 2008). Because water shortages are a real and increasing threat, the GFCSD has initiated drought planning efforts. The GFCSD has a drought plan with three stages: stage 1 requires voluntary reductions in water use of up to 15 percent; stage 2 requires further voluntary reductions in water use of up to 30 percent; stage 3 requires mandatory reductions in water use by 50 percent (Brown and Caldwell, 2007). For the past several years, the district has reached stage 1 conditions during late summer months, and has come very close to implementing stage 2.

As demand for water increases within Grizzly Flats, and water supply becomes more unpredictable as the effects of climate change reduce summer-season stream flows in North Canyon Creek and Big Canyon Creek, the water-system's source watersheds, GFCSD expects to implement the measures outlined in its drought management plan more frequently. GFCSD is considering additional options for increasing the storage capacity of

its system, including building an off-stream reservoir. Preliminary planning for system expansion has occurred (Borcalli & Associates 1998 and Wood Rodgers 2008), but there is considerable uncertainty about whether and when GFCSD would undertake construction on such a project. As a necessary precursor to system expansion, GFCSD is proposing to increase the efficiency of its existing system.

This project would support these specific actions:

Reservoir Lining. This portion of the project would provide funding for GFCSD to install a new lining over the base and walls of its pre-treatment reservoir. It would also provide funding to install a 200 gallon-per-minute pump station at the reservoir's outlet and allow the GFCSD to raise the reservoir's overflow pipe. Without the project, more than 16 acre-feet of raw water diverted into the pretreatment reservoir would continue to seep into the ground, through its unlined base and walls. GFCSD would continue to operate its reservoir at reduced capacity to minimize seepage. GFCSD would also continue to spend $14,000 to $20,000 per year in operations costs clearing cattails and other vegetation from in and around the reservoir and incur additional costs to operate its treatment plant to handle increased levels of organic matter and sediment.

Leak Detection and Repair. This portion of the project would provide funding for GFCSD to install a leak-detection system. Without the project, many leaks throughout GFCSD's system would go undetected and unrepaired, reducing the efficiency of the water system. The current procedure for detecting and identifying the location of leaks involves extensive and labor-intensive surveys, which consume limited resources dedicated to operating the system. GFCSD also would continue to spend its limited resources treating water that is not used to directly meet the demands of its customers. The system would continue to operate under constant threat of catastrophic leaks and major infrastructure failures, increasing the risk that GFCSD and its customers would face service disruptions and expensive emergency repairs.

Integrated Capital Improvement Needs Assessment and Comprehensive Conservation and Drought Preparedness Plan. This portion of the project would provide funding for GFCSD to thoroughly map its system using GIS-based techniques, and integrate its capital-improvement program with its conservation and drought-planning efforts. Without the project, GFCSD managers would have more limited information and options to effectively make decisions and prioritize investments to maximize the benefits of both supply and demand-side strategies.

Customer-Based Conservation Implementation. This portion of the project would provide GFCSD's customers with information, through workshops and public outreach, based on programs developed by the California Urban Water Conservation Council and the American Water Works Association, to help them reduce their water consumption. Without the project, customers would not have access to this information, and GFCSD would have a more limited range of options to manage its water system, especially in times of water shortage when customer-initiated conservation measures could reduce demands on the available water supply.

Plumbing Fixture Retrofit Program Implementation. This portion of the project would provide funding for GFCSD to provide 300 plumbing retrofit kits and rebates for 50 ultra-

low flush toilets to its customers. The plumbing retrofit kits would include faucet aerators, low-flow shower heads, and toilet displacement devices. Without the project, customers would continue to use old and outdated plumbing devices that consume more water than modern fixtures.

We describe the costs and benefits of these individual program elements collectively, as many of the benefits of each program component are interdependent.

2. Total Water-Quality and Other Expected Benefits

This project would generate water supply-related benefits as described below. Table 16-C presents the value of the benefits, by category, in the years they would occur, and calculates their total present value.

a. Water-Quality Benefits

Economic Benefits Associated with Enhanced Water-Quality (Unquantifiable). To the extent that the project increases water supply available for instream flows, it would provide water quality benefits by diluting pollutants, reducing temperature, and increasing dissolved oxygen, among other effects. Data are unavailable to quantify the effects the project would have on water-quality parameters in North Canyon Creek, Big Canyon Creek, the Cosumnes River, or the Sacramento-San Joaquin River Delta. Should the benefits materialize, however, they could provide economic benefits to water-users by reducing water-treatment costs, reducing costs of complying with water-quality and endangered species regulations, improving the quality of instream and near-stream recreation, improving habitat for aquatic species, and improving the quality of life of Californians who value clean water.

The beneficiaries of this benefit would include Californians who value the goods and services the water bodies the project would affect provide, the all Californians who value improving the quality of the state's natural waterways.

Passive-Use Value Associated with Increases in Salmon Populations (Unquantifiable). To the extent that the project increases the volume of instream flow for environmental purposes, the project could increase the quantity and quality of aquatic habitat for salmon in the Cosumnes River watershed. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. This benefit captures the passive-use value many Californians place on the continued existence of thriving salmon populations within the state. If data were available to quantify the increase in salmon populations resulting from the project, we would employ a value of $2,000 per additional fish per year as a rough estimate of the passive-use benefit of increase salmon populations.[11]

The beneficiaries of this benefit would Californians who value the survival of healthy salmon populations in California, but may never fish or directly interact with salmon.

[11] See regional-level benefits section for a description of the methodology and source used to derive this estimate.

Cultural Value Associated with Increases in Salmon Populations (Unquantifiable). As we describe above, the project would increase instream flow for environmental purposes, increasing the quality and quantity of aquatic habitat for salmon in the Cosumnes River watershed. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. This benefit captures the cultural value many Native American people place on the continued existence of thriving salmon populations within the state. Unlike many Californians who ascribe a monetary willingness to pay to protect salmon, even if they never intend to directly fish or watch them, many Native Americans would recognize the importance of salmon outside the cultural framework and economic terms western society often imposes (Malloy 1992). For this reason, we recognize the cultural significance that arises from the projects' improvements to salmonid populations and their habitat apart from the quantified passive-use value or other measures of economic benefits.

The beneficiaries of this benefit would include members of local Native American tribes and other Californians who believe the continued existence of salmonid populations and their habitat is essential to cultural and spiritual well-being.

b. Other Expected Benefits

Increased Quality of Recreation (Unquantifiable). Project sponsors estimate that there are currently 300 to 600 fish, primarily small-mouth bass, in the pretreatment reservoir. The pretreatment reservoir is closed to the public and these fish are not available for recreational anglers. With the project, these fish would be collected and released into nearby Grizzly Pond. Grizzly Pond is a popular fishing destination among members of the community. There are insufficient data to estimate the increase in the quality of fishing anglers would experience at Grizzly Pond resulting from the new fish. Research suggests that the average consumer surplus value of fishing, per person, per day, in the Pacific Coast region is about $50 (Loomis 2005).[12] Economic research has also shown that recreational anglers likely would go fishing more often and would be willing to pay more to go fishing if they experienced higher catch rates (Loomis, 2006). Insofar as the increase in fish available for recreation in Grizzly Pond increases catch rates and the quality of recreation experiences, the value derived by recreational anglers in Grizzly Pond would increase.

Beneficiaries of this benefit include recreational anglers at Grizzly Pond.

Enhanced Human Capital and Social Capital (Unquantifiable). The project would support efforts to prepare an Integrated Capital Improvement Needs Assessment, a Customer-based Conservation Implementation program and a Comprehensive Conservation and Drought Preparedness Plan. The process for developing these plans would engage community members and system operators in a collaborative way to understand the needs of the GFCSD system, and develop effective, locally-appropriate responses to problems that could arise in the future. The process would enhance the human capital in the GFCSD system by increasing the amount and types of information

[12] See regional-level benefits section for a description of the methodology and source used to derive this estimate.

available to system operators to manage the system effectively, and by educating customers about how to implement water-conservation practices, so they can respond to future supply constraints more effectively. The project's focus on collaborative problem-solving would enhance the social capital—the relationships and trust between and among residents and groups—in the Grizzly Flats community, which has the potential to increase the capacity of the community to solve future problems, related and unrelated to the water-supply system.

The beneficiaries of this benefit would include the operators and customers of the GFCSD, and all residents within the community of Grizzly Flats.

Please see Attachment 7 for the costs and water-supply-related benefits this project would generate.

D. Placer County Water Agency (Alta & Colfax)

The Placer County Water Agency (PCWA) project involves two programs: The Infrastructure Reliability, Conservation and Efficiency Program and The Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program. The proposed project has these elements:

Infrastructure Reliability, Conservation and Efficiency Program	Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program
Leak Detection and Repair	Customer-based Conservation Implementation
	Plumbing Fixture Retrofit Program Implementation

1. Project Description and Without-Project Conditions

Leak Detection and Repair. This portion of the project would provide funding for PCWA to install a leak-detection system in the communities of Alta and Colfax. Without the project, the communities of Alta and Colfax would continue to lose treated water to leaks throughout their water systems. Estimates developed by the project sponsor using the Water Audit Worksheet from the American Water Works Association suggest that the community of Alta loses around 50 acre-feet annually, and the community of Colfax loses around 118 acre-feet annually.[13] The source and fate of most of the leaking water is unknown. Given the area's porous soils, it likely percolates into the water table or into nearby surface water bodies. The current procedure for detecting and identifying the location of leaks involves extensive and labor-intensive surveys, which consume limited resources dedicated to operating the system. PCWA also would continue to spend its limited resources treating water that is not used to directly meet the demands of its customers. The system would continue to operate under constant threat of catastrophic leaks and major infrastructure failures, increasing the risk that PCWA and its customers would face service disruptions and expensive emergency repairs.

[13] These numbers represent the average of the real water loss estimates developed for each community in 2006 and 2007.

Customer-Based Conservation Implementation. This portion of the project would provide PCWA's customers with information, through workshops and public outreach, based on programs developed by the California Urban Water Conservation Council and the American Water Works Association, to help them reduce their water consumption. Without the project, customers would not have access to this information, and PCWA would have a more limited range of options to manage its water system, especially in times of water shortage when customer-initiated conservation measures could reduce demands on the available water supply.

Plumbing Fixture Retrofit Program Implementation. This portion of the project would provide funding for PCWA to provide 1,500 plumbing retrofit kits to its customers. The plumbing retrofit kits would include faucet aerators, low-flow shower heads, and toilet displacement devices. Without the project, customers would continue to use old and outdated plumbing devices that consume more water than modern fixtures.

We describe the costs and benefits of these individual program elements collectively, as many of the benefits of each program component are interdependent.

2. Water-Quality and Other Expected Benefits

This project would generate water supply-related benefits as described below. Table 16-D presents the value of the benefits, by category, in the years they would occur, and calculates their total present value.

a. Water-Quality Benefits

Economic Benefits Associated with Enhanced Water-Quality (Unquantifiable). To the extent that the project increases water supply available for instream flows, it would provide water quality benefits by diluting pollutants, reducing temperature, and increasing dissolved oxygen, among other effects. Data are unavailable to quantify the effects the project would have on water-quality parameters in the Drum Spaulding system, or downstream in the Sacramento-San Joaquin River Delta. Should the benefits materialize, however, they could provide economic benefits to water-users by reducing water-treatment costs, reducing costs of complying with water-quality and endangered species regulations, improving the quality of instream and near-stream recreation, improving habitat for aquatic species, and improving the quality of life of Californians who value clean water.

The beneficiaries of this benefit would include Californians who value the goods and services the water bodies the project would affect provide, the all Californians who value improving the quality of the state's natural waterways.

Passive-Use Value Associated with Increases in Salmon Populations (Unquantifiable). To the extent that the project increases the volume of instream flow for environmental purposes, the project could increase the quantity and quality of aquatic habitat for salmon in downstream waterways where they currently exist, and improve conditions in waterways where they have been extirpated, but could be reintroduced in the future. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. This benefit captures the passive-use value many

Californians place on the continued existence of thriving salmon populations within the state. If data were available to quantify the increase in salmon populations resulting from the project, we would employ a value of $2,000 per additional fish per year as a rough estimate of the passive-use benefit of increase salmon populations.[14]

The beneficiaries of this benefit would Californians who value the survival of healthy salmon populations in California, but may never fish or directly interact with salmon.

Cultural Value Associated with Increases in Salmon Populations (Unquantifiable). As we describe above, the project would increase instream flow for environmental purposes, increasing the quality and quantity of aquatic habitat for salmon in downstream waterways where they currently exist, and improve conditions in waterways where they have been extirpated, but could be reintroduced in the future. Direct, quantitative linkages between the project and salmon-related benefits, such as an increase in salmon populations, are impossible to identify, given the available information. This benefit captures the cultural value many Native American people place on the continued existence of thriving salmon populations within the state. Unlike many Californians who ascribe a monetary willingness to pay to protect salmon, even if they never intend to directly fish or watch them, many Native Americans would recognize the importance of salmon outside the cultural framework and economic terms western society often imposes (Malloy 1992). For this reason, we recognize the cultural significance that arises from the projects' improvements to salmonid populations and their habitat apart from the quantified passive-use value or other measures of economic benefits.

The beneficiaries of this benefit would include members of local Native American tribes and other Californians who believe the continued existence of salmonid populations and their habitat is essential to cultural and spiritual well-being.

b. Other Expected Benefits

Enhanced Human Capital and Social Capital (Unquantifiable). The project would serve as a test of the software and protocols to detect and locate leaks in a water system in this region of California. By implementing the project, PCWA staff would acquire knowledge that would be useful to other water-system operators within and beyond the PCWA system. The data collected in Alta and Colfax, and an annual report detailing the effectiveness of the system, will be posted on the CABY website, and would provide information to other system operators in other parts of the CABY region, and in other regions throughout California, who are considering adopting the system. The information gathered through this project has the potential to make the adoption of the system elsewhere more efficient and less costly to other system operators. These benefits, while potentially very tangible to other system operators throughout California, are unquantifiable.

The project would also support efforts to prepare a Customer-based Conservation Implementation program. This program would engage community members and

[14] See regional-level benefits section for a description of the methodology and source used to derive this estimate.

system operators in a collaborative way to learn about the importance of conservation and develop effective, locally-appropriate responses to water-supply problems that could arise in the future. The process would enhance the human and social capital in the communities of Alta and Colfax by educating customers about the water system and their personal water use, so they can respond to future supply constraints more effectively.

The beneficiaries of this benefit would include the operators of PCWA and other water systems that are considering adopting the leak-detection system proposed to be implemented in this project. Beneficiaries would also include PCWA's customers and ratepayers in Alta and Colfax, and potentially the ratepayers of other systems that benefit from the knowledge developed by PCWA.

Please see Attachment 7 for the costs and water-supply-related benefits this project would generate.

E. American Rivers CABY Water Trust

1. Project Description Without-Project Conditions

Through the CABY Water Trust project American Rivers, working in conjunction with other regional stakeholders, would set up an institutional structure in the CABY region with the capacity to purchase or lease water rights from willing sellers and re-dedicate that water to instream flow for environmental purposes. This project arises to position the region so it is prepared to take advantage of anticipated changes in water-management regulations. The State of California is currently developing regulations to establish instream flow requirements, which would place limits on water withdrawals in certain waterways during certain times of the year.

Without the project, state and federal regulators and other stakeholders would rely on existing legal and regulatory mechanisms to ensure that instream flows in the region comply with current and future regulatory standards. These mechanisms typically entail reducing water withdrawals without regard for any economic or practical considerations. This type of enforcement can be time-consuming and costly, and can result in protracted and expensive litigation.

With the project, an institutional framework would exist with the capacity to support the identification of potential supplies of water available from willing sellers, the negotiation of necessary legal requirements to lease or purchase water, and the identification and prioritization of stream reaches where increased instream flow would produce benefits. The water trust would reduce regulatory costs compared to traditional enforcement mechanisms and would have the potential to produce greater levels of environmental benefits more quickly.

Please see Attachment 7 for the costs and water-supply-related benefits this project would generate.

2. Water-Quality and Other Expected Benefits

This project would generate other expected benefits as described below. Table 16-D presents the value of the benefits, by category, in the years they would occur, and calculates their total present value.

a. Other Expected Benefits

Enhanced Human Capital and Social Capital (Unquantifiable). The CABY Water Trust project would enhance the stock of social and human capital in the CABY region by setting up an institutional and legal framework to facilitate voluntary water transfers from out-of-stream diversions and consumptive uses to increase instream flow for environmental purposes. In addition to setting up the institutional and legal framework required to facilitate transfers, the project would develop a body of information supportive of transfers, enable interested parties to develop skills needed to execute transfers that would increase instream flows, and support collaboration among stakeholders to build trust and overcome barriers that could impede its success.

Through the implementation of similar water-trust programs elsewhere, several barriers have been identified that must be overcome if there is to be a successful, voluntary water-transfer program. These barriers fall into several categories, which the project would help address and overcome:

- **Legal impediments to water transfers.** These may include limits on who can transfer water rights, where it can be transferred, the uses to which transferred water may be applied, and how much can be transferred.
- **Lack of information about prices and water available for sale or purchase.** This lack of information may limit the willingness of water users to participate in the market.
- **High transaction costs.** Transactions costs include legal expenses to overcome the complexity of transfers.
- **Lack of trust in the entity administering water markets.** Because the water trust is not a regulatory authority, it may be required to work harder to built trust and relationships among state and local stakeholders to demonstrate its authority.
- **Third-party impacts.** Third-party impacts include not just the effect on the water right of a third party, but also how it would affect public values, the viability of local agriculture, and the prosperity of a community.

By engaging the broad base of stakeholders in the region from the beginning, the CABY Water Trust project would support the development of relationships among a wide range of stakeholders and disseminating information and data about the physical and legal workings of the water-trust approach and potential economic efficiency gains it could bring about. The CABY Water Trust project would develop a clearinghouse for information, provide training for potential traders, and induce collaboration and cooperation among individuals from six water purveyors (Placer County Water Agency, El Dorado Irrigation District, Nevada Irrigation District, Washington County Water District, City of Nevada City, and Grizzly Flats Community Services District), environmental organizations, and three county farm bureaus (Nevada, Placer, and El Dorado), as well as 50 to 60 individual irrigators and water rights holders. Through the CABY Water Trust, these stakeholders would work together to identify and prioritize demands for instream flow in the region, as well as potential sources of available water, paving the way for future water transfers increasing instream flow for environmental purposes.

Information gathered from the CABY Water Trust project would be available and useful to other Californians, increasing the stock of human and social capital throughout the state. This project could serve as a local example of the potential benefits realized through a water trust model, and could support efforts for similar projects in other regions of the state.

The direct beneficiaries of this benefit would include individuals participating in the development of the CABY Water Trust, and other stakeholders who learn about the water trust and become involved in future water transactions involving the Trust. Indirect beneficiaries would include Californians elsewhere who take advantage of the Trust's path-breaking effects and integrate water-transfer programs to improve instream flows in other parts of the state. Additional indirect beneficiaries would include all those Californians who would experience greater instream flows and water-quality benefits sooner than would occur without the Trust.

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VI. Project-Level Water-Quality and Other Expected Benefits (Table 16)

Tables 16-A through 16-E present the project-level costs, as described above in Section IV.

Table 16-A Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Nevada City: Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Project

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value [1]	(h) Annual $ Value (f) x (g) [1]	(i) Discount Factor [1]	(j) Discounted Benefits (h) x (i) [1]
2009	No benefit								
2010	No benefit								
2011	No benefit								
2012	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2013	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2014	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2015	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2016	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2017	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2018	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2019	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2020	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2021	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2022	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2023	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2024	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2025	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2026	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2027	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2028	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2029	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2030	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2031	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2032	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2033	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2034	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2035	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2036	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2037	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2038	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2039	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2040	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2041	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2042	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2043	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2044	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2045	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2046	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2047	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2048	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2049	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2050	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2051	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2052	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2053	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2054	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2055	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2056	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2057	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2058	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
Project Life									
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries	
Comments: See narrative description in Attachment 8 for a description of these benefits.									

(1) Complete these columns if dollar value is being claimed for the benefit.

Table 16 - Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Washington County Water District: Integrated Water-Shortage Contingency, Drought Preparedness, and Comprehensive Water-Conservation Program

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009	No benefit								
2010	No benefit								
2011	No benefit								
2012	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2013	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2014	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2015	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2016	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2017	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2018	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2019	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2020	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2021	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2022	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2023	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2024	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2025	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2026	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2027	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2028	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2029	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2030	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2031	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2032	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2033	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2034	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2035	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2036	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2037	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2038	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2039	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2040	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2041	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2042	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2043	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2044	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2045	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2046	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2047	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2048	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2049	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2050	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2051	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2052	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2053	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2054	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2055	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2056	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2057	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2058	Economic value associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive use value associtated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
Project Life									
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries	
Comments: See narrative description in Attachment 8 for a description of these benefits.									

(1) Complete these columns if dollar value is being claimed for the benefit.

Table 16-C Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Grizzly Flats Community Services District: Integrated Water Shortage Contingency, Drought Preparadness, and Comprehensive Water Conservation Planning Program

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value (1)	(h) Annual $ Value (f) x (g) (1)	(i) Discount Factor (1)	(j) Discounted Benefits (h) x (i) (1)
2009	No benefit				0		$0	1.000	$0
2010	No benefit				0		$0	0.943	$0
2011	No benefit				0		$0	0.890	$0
2012	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2013	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2014	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2015	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2016	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2017	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2018	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2019	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							

	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2020	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2021	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2022	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2023	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2024	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2025	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2026	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2027	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2028	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2029	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2030	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2031	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2032	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2033	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2034	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2035	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2036	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							

	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2037	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2038	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2039	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2040	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2041	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2042	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2043	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2044	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2045	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2046	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2047	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2048	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2049	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2050	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2051	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2052	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2053	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2054	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2055	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2056	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2057	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2058	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Increased quality of recreation	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
Project Life									
									Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries
Comments: See narrative description in Attachment 8 for a description of these benefits.									

(1) Complete these columns if dollar value is being claimed for the benefit.

Table 16-D Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: Alta & Colfax Customer-Based Conservation and Plumbing-Fixture Retrofit Program Implementation

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value [1]	(h) Annual $ Value (f) x (g) [1]	(i) Discount Factor [1]	(j) Discounted Benefits (h) x (i) [1]
2009					0		$0	1.000	$0
2010					0		$0	0.943	$0
2011					0		$0	0.890	$0
2012	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)			0		$0	0.890	$0
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2013	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2014	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2015	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2016	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2017	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2018	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2019	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2020	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2021	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2022	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2023	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2024	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2025	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2026	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2027	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2028	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2029	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2030	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2031	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2032	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							

	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2033	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2034	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2035	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2036	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2037	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2038	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2039	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2040	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2041	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2042	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2043	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2044	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2045	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2046	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2047	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2048	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2049	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2050	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2051	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2052	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2053	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2054	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2055	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							

	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2056	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2057	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2058	Economic benefits associated with enhanced water-quality	Unquantifiable (See Narrative Text)							
	Passive-use value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Cultural value associated with increases in salmon populations	Unquantifiable (See Narrative Text)							
	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
Project Life									
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries	
Comments: See narrative description in Attachment 8 for a description of these benefits.									

(1) Complete these columns if dollar value is being claimed for the benefit.

Table 16-E Water Quality and Other Expected Benefits

(All benefits should be in 2009 dollars)

Project: CABY Water Trust, American Rivers

(a) Year	(b) Type of Benefit	(c) Measure of Benefit (Units)	(d) Without Project	(e) With Project	(f) Change Resulting from Project (e) – (d)	(g) Unit $ Value [1]	(h) Annual $ Value (f) x (g) [1]	(i) Discount Factor [1]	(j) Discounted Benefits (h) x (i) [1]
2009	No benefit								
2010	No benefit								
2011	No benefit								
2012	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2013	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2014	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2015	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2016	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2017	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2018	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2019	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2020	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2021	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2022	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2023	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2024	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2025	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2026	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2027	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2028	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2029	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2030	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2031	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2032	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2033	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2034	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2035	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2036	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2037	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2038	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2039	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2040	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2041	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2042	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2043	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2044	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2045	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2046	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2047	Enhanced human and social capital	Unquantifiable (See Narrative Text)							

2048	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2049	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2050	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2051	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2052	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2053	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2054	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2055	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2056	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2057	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
2058	Enhanced human and social capital	Unquantifiable (See Narrative Text)							
Project Life									
								Total Present Value of Discounted Benefits Based on Unit Value (Sum of the values in Column (j) for all Benefits shown in table) Transfer to Table 20, column (f), Exhibit F: Proposal Costs and Benefits Summaries	
Comments: See narrative description in Attachment 8 for a description of these benefits.									

(1) Complete these columns if dollar value is being claimed for the benefit.